IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the **PATENT APPLICATION** of: Stephen E. Terry	
Application No.: 10/082,844	Our File: I-2-0160.2US
Confirmation No.: 8107	Date: December 16, 2008
Filed: February 25, 2002	
For: SYNCHRONIZATION OF TIMING ADVANCE AND DEVIATION	
Group: 2616	
Examiner: Christine Y. Ng	

APPEAL BRIEF

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Brief is submitted within one (1) month of the Notice of Panel Decision from Pre-Appeal Brief Review mailed on November 20, 2008.

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I. Real Party in Interest

The real party at interest is InterDigital Technology Corporation, 300 Delaware Avenue, Suite 527, Wilmington, DE, U.S.A. 19801.

II. Related Appeals and Interferences

There are no appeals or interferences related to this application that will be directly affected by the Board's decision. This is the second appeal Applicant has filed with respect to this patent application that has a 2002 filing date; the first Appeal was mooted by the issuance of a further Action on November 2, 2006 in response to a Pre-Appeal Review Request.

III. Status of Claims

Claims 1 - 4 are pending in this application. Claims 1 - 4 are all appealed and currently stand rejected based on the June 4, 2008 Final Office Action. Claims 1 - 4 are the subject of this Appeal and are reproduced in the attached Claims Appendix.

IV. Status of Amendments

The last claim amendment was made via the Supplemental Amendment dated April 16, 2008. No after-final amendments have been presented.

V. Summary of Claimed Subject Matter

The present application contains independent claims 1 - 4. A concise summary of each independent claim with reference to support in the specification follows.

A. Claim 1

Independent claim 1 of the present application defines a method used by a mobile terminal (MT) for synchronizing wireless communications that use a time frame format having sequentially identified system time frames. (Specification at ¶¶ [00055]-[00058].) Claim 1 is particularly directed to establishing a specific time when timing adjustments are made and introduces a novel use of a Connect Frame Number to eliminate any ambiguity as to when a timing advance is applied per Specification ¶ [00062]. Per Claim 1, the MT receives a timing advance signal which includes a Connect Frame Number specifying a specific frame for making a timing adjustment. The MT then adjusts transmission timing commencing in the timeframe specified by the Connect Frame Number of the received timing advance signal. (Figure 7 and Specification at ¶¶ [00063]-[00064].)

B. Claim 2

Independent claim 2 of the present application defines a mobile terminal (MT) having a receiver, a processor and a transmitter. (Figure 9 and Specification at ¶[00054]). The receiver and transmitter are configured for wireless communications that use a timeframe format having sequentially identified system

timeframes. (Figure 9 and Specification at ¶¶ [00054]-[00058].) Claim 2 is particularly directed to a MT capable of establishing a specific time when timing adjustments are made and introduces a novel use of a Connect Frame Number to eliminate any ambiguity as to when a timing advance is applied per Specification ¶ [00062]. Per Claim 2, the MT receiver is configured to receive timing advance signals which include a Connect Frame Number specifying a specific frame for making a timing adjustment. The processor is configured to control the transmitter to adjust transmission timing commencing in the timeframe specified in the Connect Frame Number of the received timing advance signal. (Figure 7 and Specification at ¶¶ [00063]-[00064].)

C. Claim 3

Independent claim 3 of the present application defines a mobile terminal (MT) having a receiver, a processor and a transmitter. (Figure 9 and Specification at ¶[00054]). The receiver and transmitter are configured for wireless communications that use a timeframe format having sequentially identified system timeframes. (Figure 9 and Specification at ¶¶ [00054]-[00058].) Claim 3 is particularly directed to a MT capable of establishing a specific time when timing adjustments are made and introduces a novel use of a Connect Frame Number to eliminate any ambiguity as to when a timing advance is applied per Specification ¶ [00062]. Per Claim 3, the MT receiver is configured to receive timing advance signals which include a Connect Frame Number specifying a specific frame for

making a timing adjustment. The processor is configured to control the transmitter to adjust transmission timing commencing in the timeframe specified in the Connect Frame Number of the received timing advance signal. (Figure 7 and Specification at ¶¶ [00063]-[00064].)

D. Claim 4

Independent claim 4 of the present application defines a method used by a mobile terminal (MT) for synchronizing wireless communications that use a time frame format having sequentially identified system time frames. (Specification at ¶¶ [00055]-[00058].) Claim 4 is particularly directed to establishing a specific time when timing adjustments are made and introduces a novel use of a Connect Frame Number to eliminate any ambiguity as to when a timing advance is applied per Specification ¶ [00062]. Per Claim 4, the MT receives a timing advance signal which includes a Connect Frame Number specifying a specific frame for making a timing adjustment. The MT then adjusts transmission timing commencing in the timeframe specified by the Connect Frame Number of the received timing advance signal. (Figure 7 and Specification at ¶¶ [00063]-[00064].)

VI. Grounds of Rejections to be Reviewed on Appeal

Claims 1-4 stand finally rejected under § 102 as being anticipated by United States Patent 5,872,820 ("Upadrasta"). With respect to claim 1, the final Office Action states:

> Referring to claim 1, Upadrasta discloses a method of using a mobile terminal (MT) (Figure 1, mobile stations 110 and 130) for synchronizing uplink signals in a wireless communications that use a time frame format (TDMA) having sequentially identified system time frames. Refer to Column 2, lines 46-67. The method comprises:
>
> Receiving communication data within system time frames including a TA signal (Figure 4, SCB 412,422) which include TA data TEMP: current value of MFN counter that began at FNI, as specified by the SCB in step 500-535) and a Connect Frame Number (CFN) (FN2: as specified by the SCB in steps 540-545) specifying a specific frame for effectuating a timing adjustment.
>
> Adjusting (Figure 5, steps 550-555) uplink transmission timing of the MT in response to TA data in the received TA signal commencing in the time frame specified in the CFN of the received TA signal. The controller 220 and DSP 240 of a mobile station extracts a first frame number FNI from a first SCB signal. After receiving a second SCB signal, the controller 220 and DSP 240 reads the current value of the MFN counter and stores it as TEMP, and then decodes a second message frame number FN2. The controller 220 and DSP 240 then calculate the time lag as FN2 - TEMP, and adds the time lag to the mobile frame number counter. From then on, the base station assigned message frame numbers and the mobile frame numbers will be perfectly synchronized. For example, in Figure 6, the controller calculates the difference between the received second message frame number (FN2 = 10) and the stored MFN (TEMP = 8), which is "2", and adds this value to the current frame number value "10" to synchronize the frame values. Refer to Column 3, lines 10-45; and Column 4, line 45 to Column 6, line 37.

With respect to how and when timing adjustments are made, the above reasoning is also applied to claims 2-4 in that the final Office Action, states:

> Said MT processor (controller 220 and DSP 240) configured to adjust transmission timing of said transmitter in response to TA data in a received TA signal commencing in the time frame specified in the CFN of the received TA signal. Refer to the rejection of claim 1.

The rejection of claims 2-4 refers to "Oksala", but the cited Figures, passages and numbering conform to Upstrata. Accordingly, Applicant understands that the

reference to "Oksala" in the rejection of Claims 2-4 is erroneous and is intended to be to "Upstrata." Also, claim 4 is a method claim. Accordingly, Applicant understands that claim 4 is rejected for the reasons stated with respect to claim 1.

VII. Argument

A. Background Of Timing Adjustments

As explained in connection with Figures 1A, 1B, 2A and 2B of the application, timing adjustment in wireless communications are needed because communication is not instantaneous and there is a measurable amount of time that occurs between transmissions and receptions of wireless signals. This results in Timing Delays that are accounted for in conducting wireless communications between a Base Station (BS) and a Mobile terminal (MT).

When communicating using a timeframe format, typically it is desired that a Mobile Terminal will make its transmission in advance of the start of a timeslot of a timeframe so that a Base Station receives the MT's transmission when the respective timeslot starts. Figures 2A and 2B illustrates an MT making a transmission with a Timing Advance (TA), so that the BS receives the transmission at the start of the respective timeframe as viewed by the BS.

The Timing Delay in a communication between a BS and MT does not, however, remain constant. If for example, the distance between the BS and MT becomes greater, it takes longer for the signals to travel between the BS and MT so

that it becomes necessary to change the amount of Timing Advance applied when the MT makes its transmissions in order for the communication signals to continue to be received by the BS at the same time relative to the timeframe format.

B. The Claimed Use Of CFNs To Control Timing Adjustments

Pending claims 1-4 specify methods and apparatus for making MT transmission timing adjustments in formatted wireless communications by the novel use of a Connect Frame Number (CFN). For example, claim 1 specifies:

> receiving communication data within system time frames including **a timing advance signal which include** timing advance data and **a Connect Frame Number specifying a specific frame for effectuating a timing adjustment**; and
>
> **adjusting uplink transmission timing** of the mobile terminal in response to timing advance data in the received timing advance signal **commencing in the time frame specified in the Connect Frame Number of the received timing advance signal**.
> (emphasis added)

The inventor recognized a problem in the manner in which timing adjustment had been conventionally made. Base stations typically provide service for many MTs which may have different configurations and processing components. A BS would transmit a signal to adjust the amount of Timing Advance being applied by a MT and, conventionally, the MT would process that adjustment and apply the Timing Advance adjustment.

The inventor recognized that the prior art left ambiguity as to when the Timing Advance adjustments were being made by the MTs. For example, if the BS transmitted a Timing Advance signal in a first timeframe, some MTs might make

the adjustment in a second timeframe and other MTs with slower processing might make the adjustment in a third or fourth timeframe. Applicant recognized the inefficiencies arising from the prior art. For example, if the BS always expected the timing adjustment to have occurred in the second timeframe, it might then try to make a further correction when in fact the adjustment was being made in the third or later timeframe.

Applicant devised the use of the claimed Connect Frame Number in connection with timing adjustment to enable a BS to know exactly when, i.e. in which timeframe, a timing adjustment was to have taken place and, accordingly, to know when a new evaluation should start to determine if a further timing adjustment is needed.

C. Upadrasta Deals With Synchronizing Timeframe Numbering Not Timing Adjustments

The rejection of Claims 1-4 under 35 U.S.C. § 102 as being anticipated by United States Patent 5,872,820 ("Upadrasta") is clearly without merit. Upadrasta has nothing to do with the claimed timing adjustments which control adjustments as to precisely when transmissions are sent.

Upadrasta does not teach either receiving a signaled "Connect Frame Number" or adjusting "uplink transmission timing" as claimed. Upadrasta's MT's radio 260, receives and transmits timeframe formatted signals, but there is no teaching of any timing adjustment being made of MT's radio's transmissions.

Upadrasta is directed to synchronizing the timeframe reference numbering between a MT and a BS. As stated in Col. 1, line 55 *et seq.*:

> The invention provides a method and apparatus for **synchronization of frame numbers** between a base station sub-system and a mobile station. ... The amount of time lag is added to the mobile frame number counter of the mobile station **so that the mobile frame number counter is synchronized** with the base station sub-system. (Bold Emphasis added)

Upadrasta does not address adjusting the Timing Advance of MT transmissions. There is no teaching of retarding or advancing signaling between the BS and the MT in Upadrasta.

Upadrasta is directed to the coordination of the identification of the time frames. In Column 4, Upadrasta discusses an example where a timeframe identified as "9" at the BS and is initially viewed as timeframe "7" in the MT. Upadrasta teaches how the MT can adjust its counter to identify the timeframe as timeframe "9" and the next frame as "10." This has no bearing on advancing or retarding the MT's radio transmissions, i.e. the "transmission timing adjustment" defined by the present claims.

The Examiner cites the synchronization burst (SCB) as the signal being received in accordance with claim 1 that has the claimed "Connect Frame Number." This is incorrect. The SCB merely contains the identification of a current frame number as being used by the BS. The SCB signal received in Upadrasta is not taught as identifying a specific timeframe in which to make a timing adjustment as

claimed. The SCB signal is used in Upadrasta to adjust Upadrasta's MT's frame counter, not the timing of Upadrasta's MT's radio transmitter 260.

Upadrasta steps 550-555 are cited as anticipating the claimed timing adjustment of Claim 1. The last step, Step 555 concludes with "Add Time Lag To Mobile Frame Number Counter." The frame number counter is only used to identify the timeframes; it has no association with advancing or retarding the Timing Advance of the MT's radio transmissions. There is no adjusting "transmission timing" as claimed.

Upadrasta deals with setting up a communication. Once the BS and MT have their "Frame Number Counters" synchronized, there is no teaching or suggestion of how to make any timing adjustment during the wireless communication.

Moreover, Upadrasta is silent even as to determining an initial Timing Advance when a communication is set up. If some initial timing advance were, for example, in the Upadrasta example of Columns 3-4, communicated in a BS transmission in frame number "9", there is no teaching in Upadrasta that the MT is directed to make the adjustment to its transmission timing in any specific frame. Upadtasta only teaches how that frame which the MT had initially identified as "7" can be re-identified as "9" so the next frame for both the BS and MT is identified as "10," i.e. timeframe numbering synchronization. This does not tell the MT whether to make a radio transmission timing adjustment in newly numbered frame "10" or

subsequent frame "11." The synchronization of "Frame Number Counters" has nothing to do with specifying a "Connect Frame Number" as claimed.

The Upadrasta controller 220 and DSP 240 operate to correct the counter 280 so that the controller uses the proper frame number. Upadrasta's "transmitting" that is cited by the Examiner is between the Upadrasta controller 220 and DSP 240. *See*, Upadrasta column 3, line 54: "...the frame number must be 'transmitted' to the controller 220 from DSP 240." This is not "uplink transmission" as referenced in claim 1 which would be performed by Upadrasta's MT's radio 260. There is no reference to any type of timing adjustment control of Upadrasta's MT's radio 260. Accordingly, method claims 1 and 4 as well as Mobile Terminal claims 2 and 3 are not anticipated by Upadrasta.

For the above reasons, reversal of the rejection of claims 1-4 over Upadrasta and allowance are respectfully requested.

Respectfully submitted,

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Enclosures:
(1) Claims Appendix
(2) Evidence Appendix
(3) Related Proceedings Appendix

VIII. Claims Appendix

1. A method of using a mobile terminal for synchronizing uplink signals in wireless communications that use a time frame format having sequentially identified system time frames, the method comprising:

receiving communication data within system time frames including a timing advance signal which include timing advance data and a Connect Frame Number specifying a specific frame for effectuating a timing adjustment; and

adjusting uplink transmission timing of the mobile terminal in response to timing advance data in the received timing advance signal commencing in the time frame specified in the Connect Frame Number of the received timing advance signal.

2. A mobile terminal which supports wireless bi-directional communications via the utilization of a time frame format having sequentially identified system time frames, the mobile terminal comprising:

a receiver, a transmitter and an associated processor;

said receiver configured to receive communication data within system time frames including timing advance signals which include data and a Connect Frame Number specifying a specific frame for effectuating a timing adjustment;

said transmitter configured to transmit selectively formatted communication data within system time frames synchronized by said processor; and

said mobile terminal processor configured to adjust transmission timing of said transmitter in response to timing advance data in a received timing advance signal commencing in the time frame specified in the Connect Frame Number of the received timing advance signal.

3. A mobile terminal comprising:

a receiver, a transmitter and an associated processor;

said receiver configured to receive wireless communication signals within sequentially identified time frames including timing advance signals which include timing advance data and a Connect Frame Number specifying a specific frame for effectuating a timing adjustment;

said transmitter configured to transmit selectively formatted wireless communication signals within sequentially identified time frames synchronized by said processor; and

said processor configured to adjust transmission timing of said transmitter in response to timing advance data in a received timing advance signal commencing in the time frame specified in the Connect Frame Number of the received timing advance signal.

4. A method for synchronizing wireless communication signals by a mobile terminal comprising:

receiving wireless communication signals within sequentially identified time frames including timing advance signals which include timing advance data and a Connect Frame Number specifying a specific frame for effectuating a timing adjustment; and

adjusting the timing of wireless communication signal transmissions of the mobile terminal in response to timing advance data in a received timing advance signal commencing in the time frame specified in the Connect Frame Number of the received timing advance signal

IX. Evidence Appendix

None.

X. Related Proceedings Appendix

None.